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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,790	10/05/2004	Chiu-Te Lee	NAUP0474USA4	5789

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NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION
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EXAMINER

NGUYEN, DAO H

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 11/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/711,790

Applicant(s)

LEE ET AL.

Examiner

Dao H. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7,9-18,20-29,31-40 and 42-62 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-18,20-29,31-40 and 42-62 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. In response to the communications dated 08/15/2006, claims 1-7, 9-18, 20-29, 31-40, and 42-62 are active in this application.

Claim(s) 8, 19, 30, and 41 have been cancelled.

Claims 58-62 are newly added claims.

Remarks

2. Applicant's argument(s), filed 08/15/2006 have been fully considered, but are not persuasive and/or are moot in view of Fischer et al. See the following rejection(s) for further details.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless —

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

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only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claim(s) 1-5, 9-16, 20-24, 58, and 59 are rejected under 35 U. S. C. § 102 (b) as being anticipated by admitted prior art (Admission).

Regarding claim 1, Admission discloses a metal layer structure, as shown in fig.

1 of the instant application, comprising:

a substrate 11;

a first dielectric layer 16 (or one layer in the stack of layers 16) on a surface of the substrate 11;

at least one metal structure 14 disposed in the first dielectric layer 16;

a second dielectric layer 18 disposed on the first dielectric layer 16 and the metal structure 14;

at least one first conductor 24 on the first dielectric layer 16; and

at least one second conductor 26 on the first dielectric layer 16, the second conductor 26 having at least one thin portion (conductor layer 26 itself is a thin layer comparing to layer 32, or comparing to substrate 11 (note that without giving a specific value of how thin the thin portion of the second conductor is, or without giving that to what the thin portion is compared, or merely saying that it is thin, an ordinary artisan can point out various layers which is/are thicker than the claimed thin portion); and

at least one conductive plug 22 disposed in the second dielectric layer 18 for connecting the first conductor 24, the second conductor 26 and the metal structure 14.

Regarding claim 14, Admission discloses a metal layer structure, as shown in fig. 1 of the instant application, comprising:

- a substrate 11;
 - a first dielectric layer 16 (or one layer in the stack of layers 16) on a surface of the substrate 11;
 - at least one metal structure 14 disposed in the first dielectric layer 16;
 - a second dielectric layer 18 disposed on the first dielectric layer 16 and the metal structure 14;
 - at least one first conductor 24 on the first dielectric layer; and
 - at least one second conductor 22&26 on the first dielectric layer; and
 - at least one conductive plug 22 disposed in the second dielectric layer 18 for connecting the first conductor 24, the second conductor 26 and the metal structure 14;
- wherein the first conductor 24 and the second conductor 26 have a first thickness and a second thickness, respectively, and the first thickness and the second thickness impart different functions to the first conductor 24 and second conductor 26, respectively (this is inherent because the first conductor is a bonding pad, while the second conductor is a fuse).

Regarding claim 2, Admission discloses the metal layer structure wherein the second conductor has at least one thick portion (portions of layer 26 formed in and on layer 18 (that is, the thick portions of the second conductor comprise the conductor plugs 22 and portions of conductor 26 atop the plugs 22)). See fig. 1.

Regarding claim 3, Admission discloses the metal layer structure wherein a thickness of the first conductor 22&24 is equal to a thickness of the thick portion 22&26. See fig. 1.

Regarding claims 4 and 15, Admission discloses the metal layer structure wherein a ratio of a thickness of the thick portion to a thickness of the thin portion is approximately 1 to 8. See fig. 1.

Regarding claims 5 and 16, Admission discloses the metal layer structure wherein a thickness of the thick portion is approximately 0.8 to 1.6 μm , and a thickness of the thin portion is smaller than 0.8 μm . See the instant specification, pages 1-4.

Regarding claims 9 and 20, Admission discloses the metal layer structure wherein the metal structure is copper (Cu). See the instant specification, pages 1-4.

Regarding claims 10-13, 21-24, 58, and 59, Admission discloses the metal layer structure comprising all claimed limitations. See the instant specification, pages 1-4.

Claim Rejections - 35 U.S.C. § 103

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5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claim(s) 6, 7, 17, 18, 25-29, 31-40, 42-57, and 60-62 are rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art (Admission), in view of U.S. Patent No. 6,900,515 to Fischer et al.**

Regarding claims 6, 17, Admission discloses the metal layer structure further comprising:

a first opening 34 exposing the first conductor 24; and

a second dielectric layer 32 on the first dielectric layer 16 that covers the first conductor 24 and the second conductor 26. See admitted figs. 1.

Admission is silent about a second opening exposing the thin portion of the second conductor.

Fischer discloses a metal layer structure comprising of laser fuse, wherein the an opening is formed to expose the thin portion of the fuse. See col. 2, lines 1-41.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Admission so that it would include an opening that expose the thin portion of the second conductor, as taught by Fischer, in order to efficiently perform laser trimming of the fuse. See col. 2, lines 1-41 of Fischer.

Regarding claims 7, 18, Admission/Fischer discloses the metal layer structure comprising all claimed limitations. See the teaching of Admission in the pending specification.

Regarding claim 25, Admission discloses a fuse structure, as shown in fig. 1 of the instant application, comprising:

- a substrate 11, a bonding pad area and a fuse area 26 being included on a surface of the substrate 11;

- a first dielectric layer 16 on the surface of the substrate 11;

- at least one metal structure 14 disposed in the first dielectric layer 16;

- a second dielectric layer 18 disposed on the first dielectric layer 16 and the metal structure 14;

- at least one first conductor 24 (and conductor portion at ends of fuse 26 to which plug 22 is connected to) on the first dielectric layer 11 in the bonding pad area; and

- at least one second conductor 26 on the first dielectric layer 16 in the fuse area;

and

- at least one conductive plug 22 disposed in the second dielectric layer 18 for connecting the first conductor 24, the second conductor 26 and the metal structure 14;

wherein the first conductor 24 (and the thickness of the fuse 46 is smaller than that of the bonding pads 42a/b) having a first thickness is used as a bonding pad, and the second conductor 26 having a second thickness is used as a fuse. See fig. 4.

Admission does not teach that the second thickness is smaller than the first thickness.

Fischer discloses a fuse structure as shown in fig. 5 wherein the thickness of the fuse 46 is smaller than that of the bonding pads 42a/b.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Admission so that the thickness of the fuse 26 is smaller than that of the bonding pads as taught by Fischer in order to efficiently perform laser trimming of the fuse. See col. 2, lines 1-41 of Fischer.

Regarding claim 36, Admission discloses a fuse structure, as shown in fig. 1 of the instant application, comprising:

- a substrate 11, a fuse area 26 being included on a surface of the substrate 11;
- a first dielectric layer 16 on the surface of the substrate 11;
- at least one metal structure 14 disposed in the first dielectric layer 16;
- a second dielectric layer 18 disposed on the first dielectric layer 16 and the metal structure 14;
- at least one fuse 26 on the second dielectric layer 18 in the fuse area,
- at least one conductive plug 22 disposed in the second dielectric layer 18 for connecting the first conductor 24, the second conductor 26 and the metal structure 14;
- a third dielectric layer 32 on the second dielectric layer 18 that covers the fuse 26.

Admission does not teach that the fuse having a thin portion and a thick portion, nor that a first opening in the third dielectric layer 32 exposing the thin portion.

Fischer discloses a fuse structure as shown in fig. 5 wherein the fuse having a thin portion 46 and a thick portion 42a/b, and an opening is formed to expose the thin portion of the fuse. See fig. 6, and col. 2, lines 1-41.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Admission so that the fuse would have a thin portion and a thick portion, and an opening that expose the thin portion of the second conductor as taught by Fischer in order to efficiently perform laser trimming of the fuse. See col. 2, lines 1-41 of Fischer.

Regarding claim 47, Lee discloses a metal layer structure, as shown in fig. 1 of the instant application, comprising:

- a substrate 11;
- a first dielectric layer 16 on a surface of the substrate 11;
- at least one metal structure 14 disposed in the first dielectric layer 16;
- a second dielectric layer 18 disposed on the first dielectric layer 16 and the metal structure 14;

at least one first conductor 24 (and conductor portion at ends of fuse 26 to which plug 22 is connected to) on the first dielectric layer 16;

at least one second conductor 26 on the first dielectric layer 16;

at least one conductive plug 22 disposed in the second dielectric layer 18 for connecting the first conductor 24, the second conductor 26 and the metal structure 14;

wherein the first conductor 24 having a first thickness is a first material, and the second conductor 26 having a second thickness is a second material.

Admission does not teach that the second conductor having the second thickness different from the first thickness of the first conductor.

Fischer discloses a fuse structure, as shown in fig. 5, comprising a first conductor 42a/b having a first thickness and a second conductor 46 having a second thickness, wherein the first thickness is different from the second thickness. See fig. 6, and col. 2, lines 1-41.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Admission so that the first conductor would have a first thickness and a second conductor would have a second thickness different from the first thickness, as taught by Fischer, in order to efficiently perform laser trimming of the fuse. See col. 2, lines 1-41 of Fischer.

Regarding claims 26, 37, and 48, Admission/Fischer discloses the metal layer structure wherein a ratio of a thickness of the thick portion to a thickness of the thin portion is approximately 1 to 8. See figs. 4,5 of Fischer.

Regarding claims 27, 38, and 49, Admission/Fischer discloses the metal layer structure wherein a thickness of the thick portion is approximately 0.8 to 1.6 μm , and a thickness of the thin portion is smaller than 0.8 μm . See figs. 4, 5 of Fischer.

Regarding claims 28, 39, and 50, Admission/Fischer discloses the metal layer structure further comprising:

- a first opening 34 exposing the first conductor 24; and

- a second dielectric layer 32 on the first dielectric layer 16 that covers the first conductor 24 and the second conductor 26. See admitted figs. 1.

Admission is silent about a second opening exposing the thin portion of the second conductor.

Fischer discloses a metal layer structure comprising of laser fuse, wherein the an opening is formed to expose the thin portion of the fuse. See col. 2, lines 1-41.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Admission so that it would include an opening that expose the thin portion of the second conductor, as taught by Fischer, in order to efficiently perform laser trimming of the fuse. See col. 2, lines 1-41 of Fischer.

Regarding claims 29, 40, and 51, Admission/Fischer discloses the metal layer structure comprising all claimed limitations. See the teaching of Admission in the pending specification.

Regarding claims 31, 42, and 53, Admission/Fischer discloses the metal layer structure wherein the metal structure is copper (Cu). See the instant specification, pages 1-4.

Regarding claims 32, 43, and 54, Admission/Fischer discloses the metal layer structure wherein the third dielectric layer is a low-k dielectric layer. See the instant specification, pages 1-4.

Regarding claims 33, 44, and 55, Admission/Fischer discloses the metal layer structure wherein the metal structure is copper, and the third dielectric layer is a low-k dielectric layer. See the instant specification, pages 1-4.

Regarding claims 34, 45, and 56, Lee discloses the metal layer structure wherein a dielectric constant of the low-k dielectric layer is approximately 2.0 to 3.5. See the instant specification, pages 1-4.

Regarding claims 35, 46, and 57, Admission/Fischer discloses the metal layer structure wherein the low-k dielectric layer comprises a carbon-contained oxide layer or an inorganic dielectric material layer. See the instant specification, pages 1-4.

Regarding claims 60-62, Admission/Fischer discloses the metal layer structure comprising all claimed limitations. See the instant specification, pages 1-4.

Conclusion

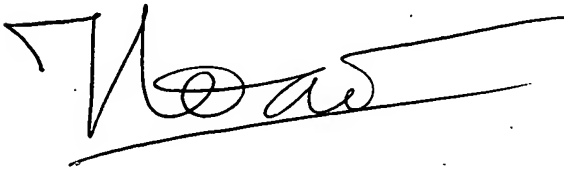
7. **THIS ACTION IS MADE FINAL.** A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dao Nguyen whose telephone number is (571)272-1791. The examiner can normally be reached on Monday-Friday 9:00am - 6:00pm. If

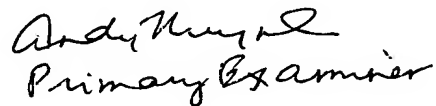
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attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith, can be reached on (571)272-1907. The fax numbers for all communication(s) is (571)273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571)272-1625.

A stylized handwritten signature in black ink, appearing to read 'D. Nguyen'.

Dao H. Nguyen
Art Unit 2818
October 29, 2006

A handwritten signature in black ink, appearing to read 'Andy Nguyen'.

Primary Examiner